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1991 AMA Survey on The Management of Technology

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The Management of Technology

The full range of technology drives today's business. A manufacturer may boast state-of-the-art production facilities, but an out-of-date communications system will dull its competitive edge. A service firm may excel in data communications, but its customers may find its telephone lines always busy.

Thus the American Management Association urged its survey respondents to consider their **total** technological package, present and future. Our survey instrument, with its various fields of inquiry, posed these essential questions: Where are you now, internally and competitively? Where do you want to be? What are you doing to get there?

In our mind is an old cartoon that pictured two men in vested suits standing proudly at the gates of a sprawling, spanking-new factory. "Well," says one to the other, "what'll we make?" Technology must be **managed** — planned, developed, paid for, and put to good use. If it doesn't result in a **market** advantage for the firm's products or services, or in a **cost** advantage to the business, why bother? And technology must be **weighed** for its effect on the firm's direction. If it doesn't match up with the company's business strategy, why expect it to yield advantage?

Our study of the data from more than 1,100 respondent firms uncovered these facts:

- Companies on the technological cutting edge are working hard to stay there — harder than companies attempting to catch up. These leading edge firms are busier upgrading their technologies, and rushing them on line more quickly; and they expect to gain a more immediate competitive advantage from these innovations than other companies anticipate.
- By allocating the resources now, companies on the leading edge expect to save money in the future. Their operating and development costs are less likely to rise, and if they do rise, it will be at a lesser rate.
- They are able to drive these changes because they have the enthusiastic support of senior management; because the organizational environment welcomes innovation and change; and because the technical staff itself, rather than internal or external customers, are creating the impetus for change.

What kind of organization rides the leading edge to competitive advantage? Why do some firms flourish while others founder? The data tells the story.

Summary of Key Findings

COMPETITIVE POSITION:

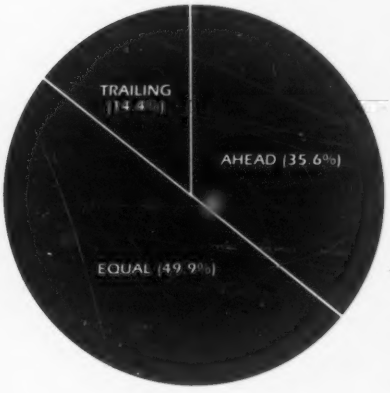
To establish competitive benchmarks for respondent firms, we posed this question:

> With its present technology, your organization's competitive position within your industry is:

- Ahead of the competition with leading-edge technology
- Equal to the competition with up-to-date technology
- Trailing the competition with out-of-date technology

A third of all respondents placed themselves at the leading edge, slightly over half were up-to-date, and 15% said they trailed.

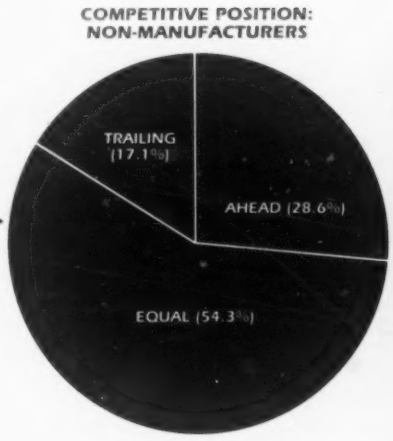
COMPETITIVE POSITION: MANUFACTURERS



Manufacturers describing themselves as "ahead of the competition with leading edge technology" included 45% of the sample's producers of apparel and finished fabric products, 48% of chemical firms, and 56% of makers of instrumentation, optical, and medical devices. Trailing the competition were 23% of the primary metals industry, 21% of printing and publishing firms, and 23% of food processors and providers.

Service firms who said they are ahead of the competition with leading edge technology included 48% of the sample's providers of business services, 40% of the communications firms, and 33% of retail traders. Among those trailing with out-of-date technology were 23% of wholesalers and distributors.

COMPETITIVE POSITION: NON-MANUFACTURERS



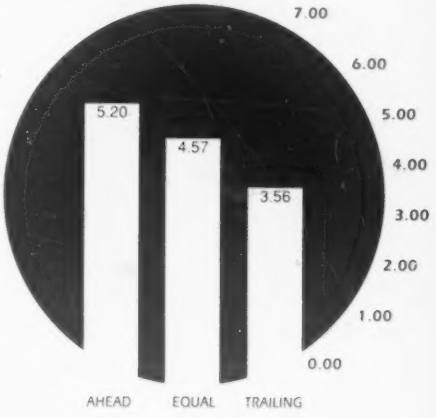
ENVIRONMENTS: Innovation and change are noticeably more welcome in leading edge organizations, not the least because the technological package aligns well with business strategy.

DEALING WITH TECHNOLOGICAL CHANGE (LEADING EDGE FIRMS)

The higher the number on the seven-point scale provided, the better the match of a firm's technologies with its business strategy. Leading edge firms gave themselves significantly higher marks.

How well does the organization deal with technological change? Leading edge companies were four times more likely to welcome such change than were firms that trail the competition.

MATCHING TECHNOLOGY TO BUSINESS STRATEGY



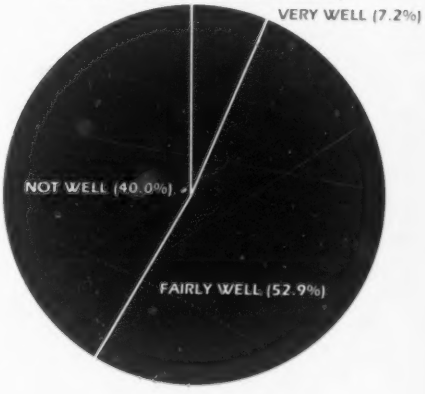
DEALING WITH TECHNOLOGICAL CHANGE (TRAILING FIRMS)

DEALING WITH OTHER FORMS OF CHANGE (LEADING EDGE FIRMS)

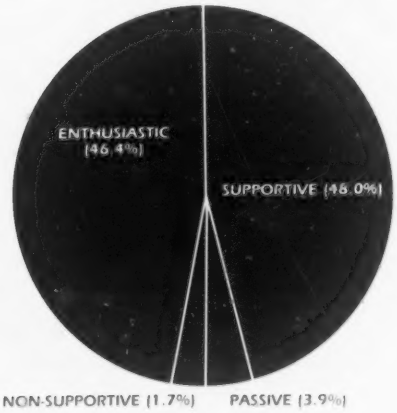
Nearly half of the firms with out-of-date technologies reported high levels of resistance to **new** technologies.

Compared with 21% of leading edge firms, a bare 7% of the trailing organizations reported that they warmly welcome other, non-technological forms of change and innovation. Overall, manufacturing firms proved slighly more resistant to innovation than non-manufacturers.

DEALING WITH OTHER FORMS OF CHANGE (TRAILING FIRMS)



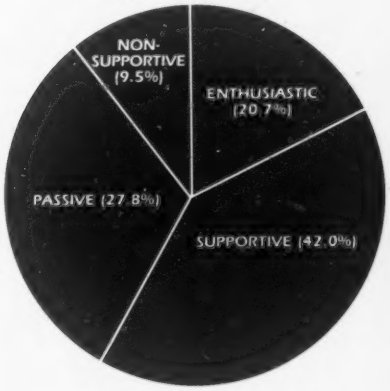
SENIOR MANAGEMENT ATTITUDES (LEADING EDGE FIRMS)



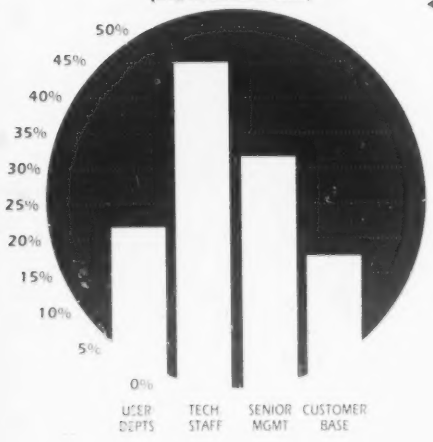
Nearly half of the leading edge firms reported that senior management gives "enthusiastic" support to the introduction and utilization of new technologies.

Companies with out-of-date technologies were seven times more likely than leading edge firms to characterize senior management as 'passive' or 'non-supportive.'

SENIOR MANAGEMENT ATTITUDES (TRAILING FIRMS)



ORIGIN OF IMPETUS FOR TECHNOLOGICAL CHANGE (LEADING FIRMS)

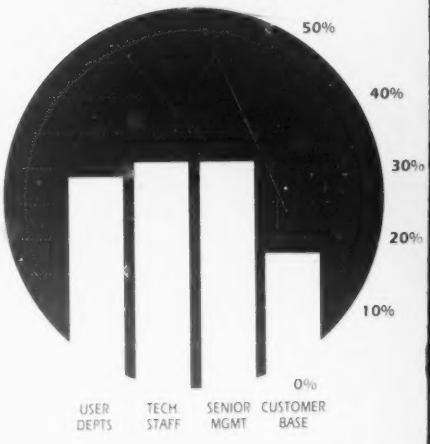


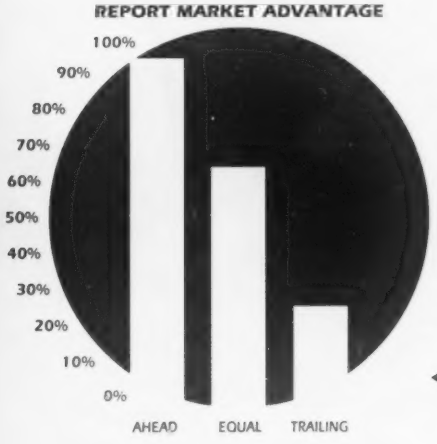
Technicians, not end users, most often provide the impetus for technological change in leading edge organizations. Users may demand what the competition already has at work, while technicians imagine new processes that yield a competitive **advantage**.

Companies that trail the competition reported more frequently that the impetus for technological change comes from user departments.

Overall, the larger the organization, the more likely that the drive for new technologies originates with the technical staff. Manufacturers (20%) are more reliant on the customer base for innovative change than are non-manufacturers (12%).

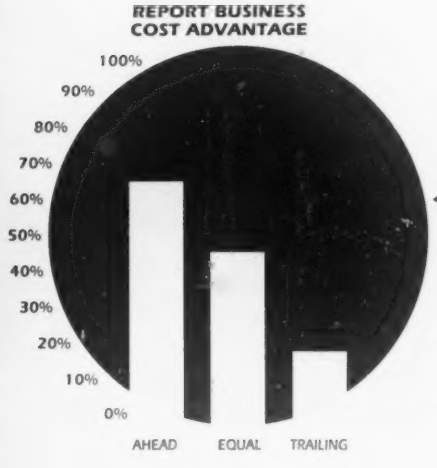
ORIGIN OF IMPETUS FOR TECHNOLOGICAL CHANGE (TRAILING FIRMS)





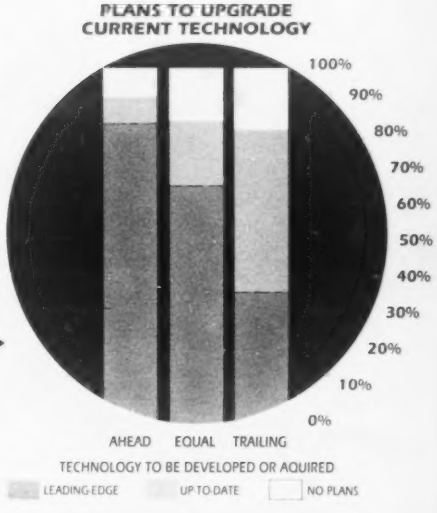
BENEFITS: Advanced technology is not a benefit in itself; it ought to yield a **competitive advantage.** This may take the form of a **market** advantage to products or services, or a **cost** advantage to business operations.

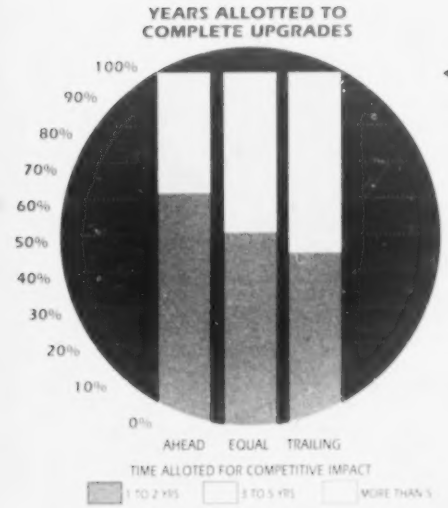
Nearly all the leading edge firms (95%) report that their present technology provides a market advantage over the competition. For 89% of these firms, the advantage takes the form of enhanced product performance or service delivery; the remainder cite other reasons.



Two-thirds of the leading edge firms report that their present technology provides a cost advantage to the business. 88% of these companies say that the cost advantage comes from enhanced productivity; 12% cite other reasons.

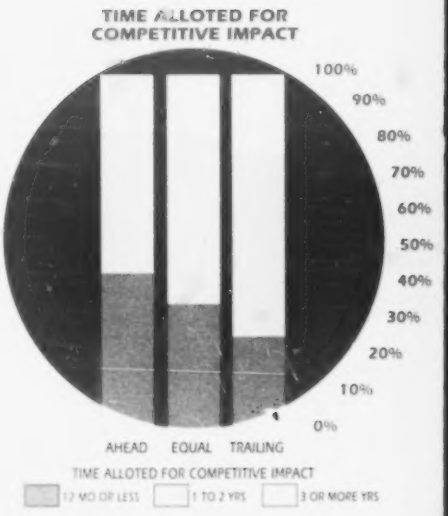
Leading edge firms are committed to maintaining their competitive advantage via technological upgrades. Eight out of ten currently plan to develop or acquire **new** leading-edge technology. In comparison, only a third of the firms that trail the competition report such plans.



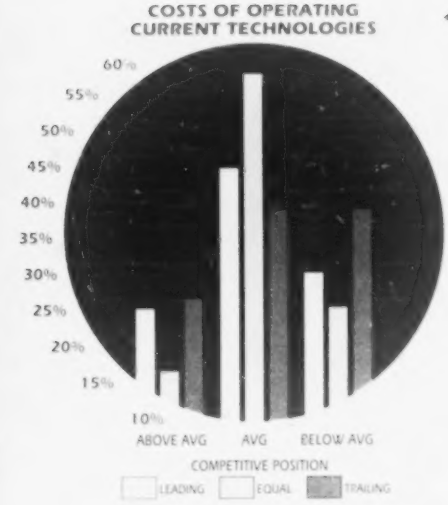


On average, leading edge firms will complete their upgrades in 2.5 years, compared with an average 3.4 years for out-of-date firms.

And leading edge companies expect new technologies to yield benefits quickly. 42% expect a competitive advantage in a year or less; only 25% of trailing firms work on the same assumption.

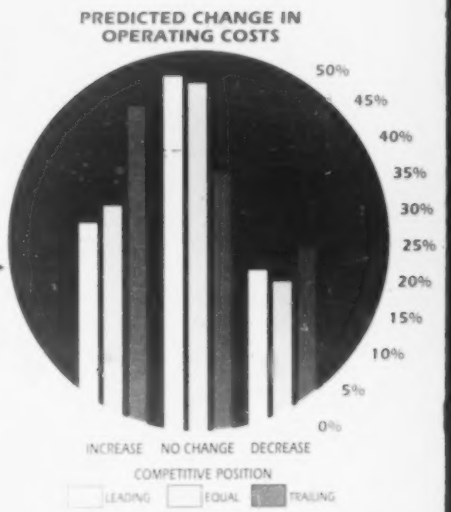


COSTS: Respondents were asked to compare their costs of operating present technologies, and of developing or acquiring new technologies, with others in the same industry.

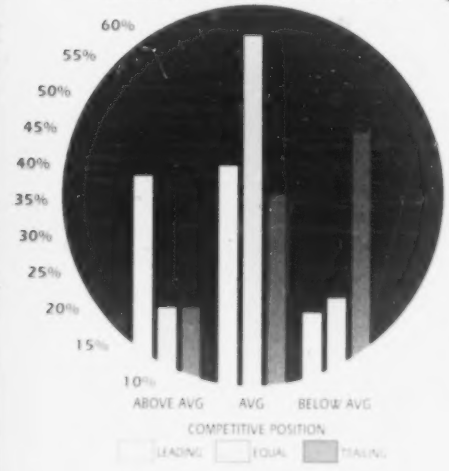


Companies that trail the competition were more likely to report that **current** operating costs are below industry averages.

But far more of these trailing firms expect operating costs to rise over the next three years, and at a higher average annual rate (10.1%, compared with 7.9% for leading edge firms that anticipate a cost increase). While leading edge firms may have higher costs **now**, they will realize important savings down the road.



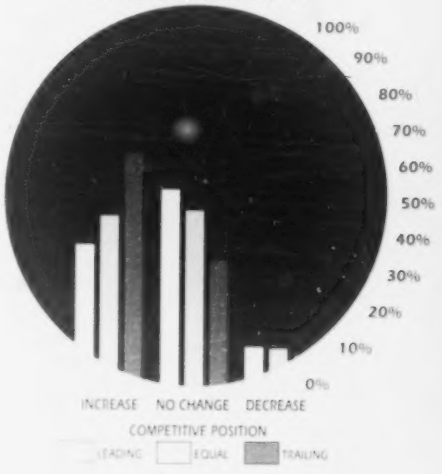
COSTS OF DEVELOPING / ACQUIRING NEW TECHNOLOGY



Leading edge firms were twice as likely as others to report that their current acquisition and development costs are above industry averages, and nearly half the trailing firms reported below-average costs.

But far more out-of-date firms expect development costs to rise, and at a higher annual rate (an average 11.9%, compared with 9.5% for all others expecting an increase). Leading edge firms expect a greater rate of **decrease** in annual costs (11%, compared with 6.6% for others anticipating lesser costs).

PREDICTED CHANGE IN ACQUISITION DEVELOPMENT COSTS



FORECASTS: Technology-based competitive standings are relative, and constantly in flux. Based on combined responses to queries about **current** positions and **future** plans, we can paint pictures of our respondent base three years hence.

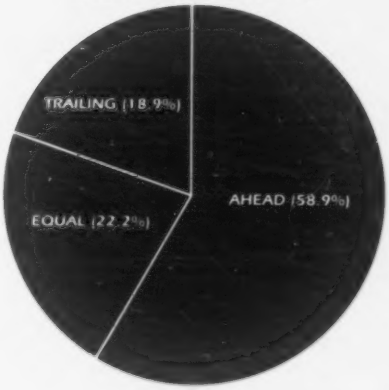
FORECAST COMPETITIVE POSITION (MANUFACTURERS)

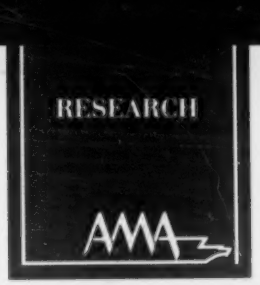
A majority of manufacturers plan to develop or acquire leading edge technology in the next three years. But in some firms plans are static, and others boasting state-of-the-art technology **now** are resting on their laurels.

Non-manufacturers will edge ahead of manufacturers.

Wishing will not make it so. Unless the organizational environment changes to match the profile of today's leading edge firms (a welcoming attitude towards innovation and change, and enthusiastic backing from senior management), technology itself will prove an uncertain resource in the 90's.

FORECAST COMPETITIVE POSITION (NON-MANUFACTURERS)





About this Survey

In the design of the survey instrument for this project, AMA received valuable guidance from Ron Mallis and Sam Fleming of Decision Resources, an Arthur D. Little affiliate based in Burlington, Massachusetts. We gratefully acknowledge their assistance. The final design, list selection, tabulations, and analysis are the entire responsibility of AMA Research Reports.

Our questionnaire was mailed on November 30, 1990, to 10,000 selected AMA members. Some 6,175 are manufacturing, purchasing, research and development managers, and 1,670 are information systems managers, in large and midsized corporations; an additional 2,155 are chief executives of smaller companies. We closed off returns on Friday, December 21, 1990, with 1,103 usable responses, an 11% return rate — somewhat above the average for an AMA membership survey.

This self-selecting sample presents the following statistical profile:

SIC CLASSIFICATION

- Agriculture, Forestry, & Fishing 0.6%
- Mining & Mineral Extraction 1.1%
- Construction 0.9%
- Manufacturing 59.5%
- Transportation, Communications, & Utilities 5.5%
- Wholesale Trade & Distribution 2.7%
- Retail Trade 1.6%
- Finance, Insurance, and Real Estate 5.1%
- Services 18.9%
- Public Administration 1.9%
- Unclassified and Unclassifiable Establishments 2.1%

ANNUAL SALES*

- Under $10 million 21.0%
- $10-$50 million 24.6%
- $50-$249 million 26.0%
- $250-$500 million 8.1%
- Over $500 million 17.7%
- Not Reported 2.6%

*or operating budget, for nonprofit organizations.